

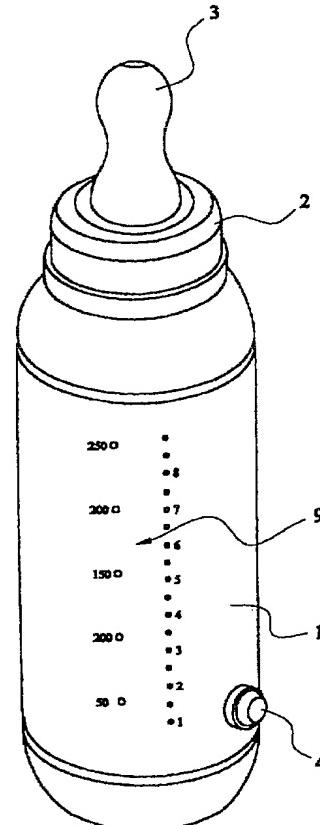
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(72) Inventor(s) <b>Mark Angus Ferguson</b>	(56) Documents Cited GB 2323838 A GB 2139903 A EP 0207851 A1 US 5180071 A US 4828126 A US 3511407 A
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(54) Abstract Title  
**Bottle**

(57) A bottle [1], for instance, one intended for feeding babies, comprises a main portion adapted to hold liquid, a removable cap [2] having an opening through which liquids may be sucked from the interior of the bottle, and a one-way valve [4] located at the end of the bottle remote from the cap, said valve [4] having an inlet side on the exterior of the bottle wall and an outlet side in the interior of the bottle wall, for admitting ambient atmosphere into the interior [8] of the bottle, from the inlet to the outlet of the valve when the pressure at the outlet of the valve falls below that of the ambient atmosphere, thus compensating for the partial vacuum formed as liquid is sucked from the bottle, thereby making sucking more easy. The valve [4] may be located on the side of the bottle [1] or in a domed recess in the bottom and the bottle wall may be provided with a thermal insulation layer. The cap [2] may take the form of a teat [3] or may be adapted for movement between a first position in which the bottle is closed and a second, open position. The bottle may have a graduated scale [9].

**FIG. 1**
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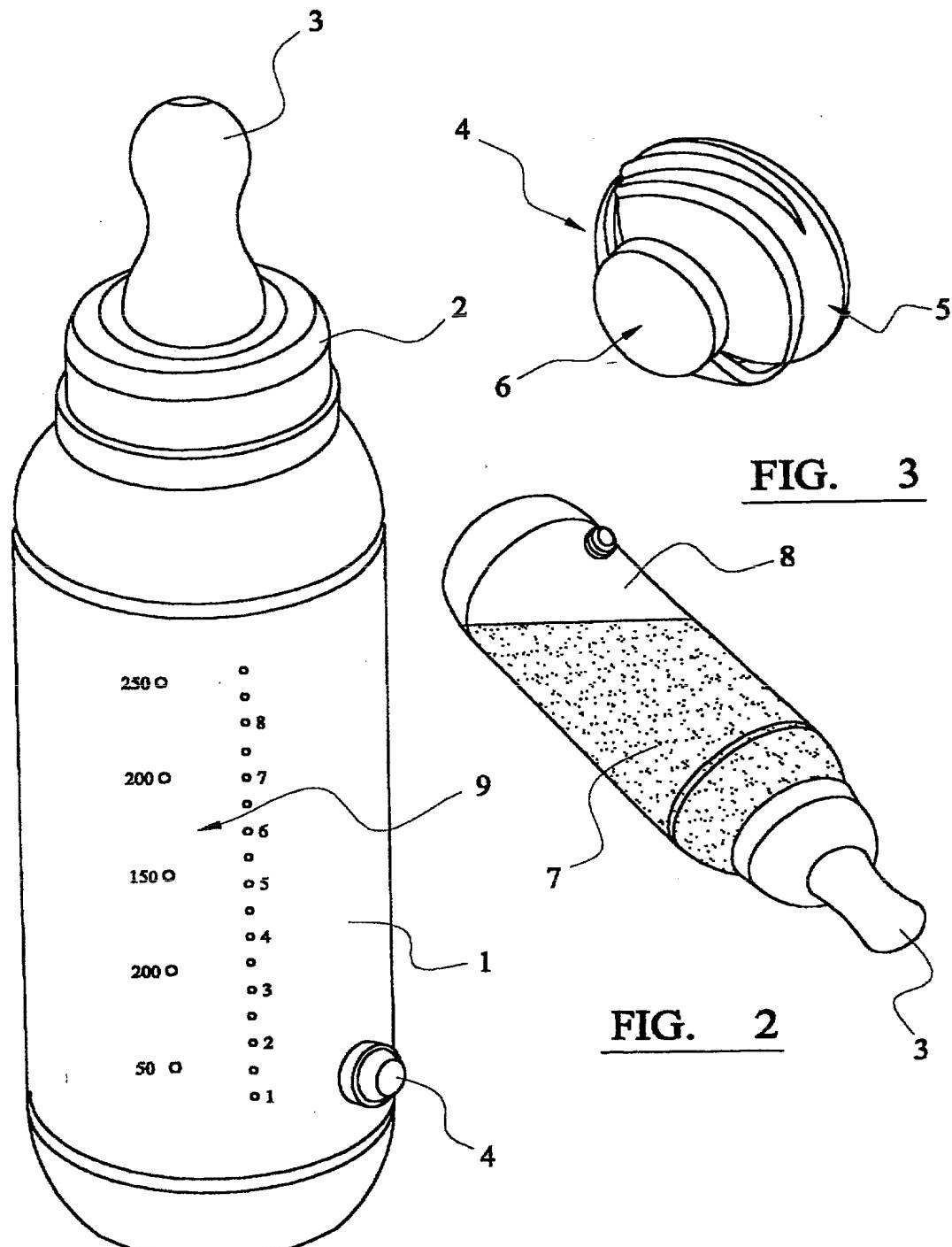


FIG. 1

FIG. 2

FIG. 3

**2350096**

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**BOTTLE**

This invention relates to a bottle from which liquid may conveniently be sucked. More particularly, it relates to a bottle provided with a means of ensuring that, when the bottle is tilted and a liquid is sucked from it, the reduction in the quantity of liquid in the bottle is compensated for by a flow into the bottle from the ambient atmosphere.

It is well known when a bottle is tilted so that one may drink from it, it becomes progressively more difficult to suck the liquid from the bottle because of the creation of a partial vacuum above the level of the liquid. Consequently, when the pressure of the partial vacuum drops sufficiently, it becomes essentially impossible to drink from the bottle without stopping drinking to allow air through the neck of the bottle. This is a particular problem with bottle-fed babies.

The present invention therefore provides a bottle comprising a main portion adapted to hold liquid, a removable cap having an opening through which liquids may be sucked from the interior of the bottle, and a one-way valve located at the end of the bottle remote from the cap, said valve having an inlet side on the exterior of the bottle wall and an outlet side in the interior of the bottle wall, for admitting ambient atmosphere into the interior of the bottle, from the inlet to the outlet of the valve when the pressure at the outlet of the valve falls below that of the ambient atmosphere.

In one embodiment, the invention is a baby's feeding bottle, provided with a teat on the cap. In another embodiment of the invention, it is provided with a cap which can be moved from a first position wherein the bottle is sealed, to a second position, wherein liquid may be sucked from the bottle. This latter

type of bottle is for instance commonly used for sports drinks or isotonic drinks.

The present invention will be more thoroughly described with reference to the accompanying Drawings, of which

5           **Figure 1 is a baby's feeding bottle according to one embodiment of the invention;**

10           **Figure 2 is a view of the bottle when tilted into a drinking position; and**

15           **Figure 3 is a view of one form of valve suitable for use in accordance with the invention.**

20           Referring now to the Drawings, Fig 1 gives a view of a baby feeding bottle according to the invention which comprises a main body [1], a cap [2] provided with a teat [3]. A one-way valve [4], more fully described below, is located in the lower part of the wall of the bottle. If desired, the one-way valve [4] may be located within a recessed portion at the base of the bottle, corresponding to the punt in a wine bottle. A graduated scale [9] may optionally be provided on the bottle to simplify making the correct strength of any formulation to be drunk from the bottle.

25           As shown in Figure 2, when the bottle is tilted into a drinking position, liquid [7] within the bottle leaves a space [8] above the liquid. Before the bottle is drunk from, this will comprise the air left in the bottle when filled. When the bottle is in this position, the ambient atmosphere is able to communicate with this space [8] through the one-way valve, which opens to permit the ambient

atmosphere to pass into space [8], when the pressure within space [8] is sufficiently lower than that of the ambient atmosphere.

Figure 3 shows one embodiment of the one-way valve [4]. This can advantageously be such as to be removed from the bottle for convenient cleaning. It can be, for instance, a push fit in a bore, or screwed into an appropriate fitting. It comprises a spring loaded diaphragm [5], so that air may be passed through the valve and air vent [6] when the pressure drop across the valve exceeds the closing force exerted by the spring. When sufficient air has entered the bottle, the force of the spring closes the valve.

Another embodiment of the invention can comprise a bottle intended for use by adults when taking exercise. Such a bottle will not have a teat, but can be provided with a known cap which provides a member which can be moved from a first position, wherein the bottle is closed, and a second position wherein liquid may be sucked through the bottle. In one known form, this comprises a bore within which a slidable member may be slid from a closed position, wherein a domed portion of the member seals the bore, into an open position, where channels provided within the slidable member allow liquid to flow out of the bottle. This form of bottle may be provided if desired with a thermally insulating layer on the surface.

The first embodiment of the invention is convenient for bottle-feeding small children in a manner which diminishes the ingestion of wind, reducing the chance of colic and the need to bring the child's wind up.

It has been observed that when children are breast-fed, they suffer relatively little from wind, but once they are bottle-fed, it is found that they are far more

likely to suffer from wind. This is because of the slightly different techniques used in breast-feeding and in bottle-feeding.

When a baby is feeding from the breast, an essentially airtight seal is formed between its lips and the breast. As the baby sucks on the nipple, this stimulates the breast into producing milk, and the harder the baby sucks, the more milk is produced.

When the baby is bottle-fed on the other hand, an airtight seal is formed between the lips and the bottle in much the same manner as with the breast, but the baby has to suck the milk out of the bottle. The amount which will issue from the bottle depends on how hard the baby is able to suck. Because, in a conventional bottle, there is no means of restoring air to compensate for the milk taken from the bottle, the more that is removed the greater is the vacuum created above the liquid level. Therefore, the baby has to suck harder. After a while, the baby is unable to suck further liquid and the baby is no longer able to form a seal with the teat. As the baby will be sucking hard at the time that this happens, a large quantity of air is likely to be sucked into the baby's stomach. This explains why it is often a long drawn out process to give a bottle feed, because of the need to bring the wind up.

When using a child's feeding bottle according to the invention, it is found that a child who has been used to breast feeding, will often suck the milk from the bottle according to the invention too rapidly. However, they soon become accustomed to using the bottle according to the invention.

**CLAIMS**

1. A bottle comprising a main portion adapted to hold liquid, a removable cap having an opening through which liquids may be sucked from the interior of the bottle, and a one-way valve located at the end of the bottle remote from the cap and having an outlet side on the exterior of the bottle wall and an outlet side in the interior of the bottle wall, for admitting ambient atmosphere into the interior of the bottle, from the inlet to the outlet of the valve when the pressure at the outlet of the valve falls below that of the ambient atmosphere.
2. A bottle as claimed in Claim 1 wherein the valve is located in the side wall of the bottle.
3. A bottle as claimed in Claim 1 wherein the valve is located in a domed recess in the bottom of the bottle.
4. A bottle as claimed in Claim 3 wherein a thermal insulation layer is provided on the bottle wall.
5. A bottle as claimed in any one of Claims 1 to 4 wherein the cap is in the form of a baby's teat.
6. A bottle as claimed in any one of Claims 1 to 4 wherein the cap is adapted for movement between a first position, wherein the bottle is closed, and a second position, wherein liquid may be sucked from the bottle.
7. A bottle as claimed in Claim 1 and substantially as hereinbefore described.



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**Application No:** GB 9911403.5  
**Claims searched:** 1 to 7

**Examiner:** Mike Henderson  
**Date of search:** 5 August 1999

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): A5X B8D (DCE DCF5 DCG DFX) B8T (TWG TWH)

Int Cl (Ed.6): A61J 9/04 9/08

Other: ONLINE: WPI,EDOC,JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X, Y	GB 2323838A (CASEY et al) (Whole disclosure relevant)	X:Cl 1 & 5 Y:Cl 4 & 6
X, Y	GB 2139903A (BYONG WHA SUH) (Whole disclosure relevant)	X:Cl 1 to 3 & 5 Y:Cl 4 & 6
Y	EP 0207851A1 (PAQUETTE) (Figs 1 & 2 particularly relevant)	6
Y	US 5180071 (CROSSON) (Whole disclosure relevant)	4
X, Y	US 4828126 (VINCINGUERRA) (Whole disclosure relevant)	X:Cl 1,3 & 5 Y:Cl 4 & 6
X, Y	US 3511407 (PALMA) (Figs 1 to 5 particularly relevant)	X:Cl 1,3 & 5 Y:Cl 4 & 6

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.